Nov. 10, 1925. 1,560,719

J. O. OLSON

METHOD OF FORMING A CLOSED SPIRAL CHAMBER FROM SHEET METAL

Filed May 7, 1924 2 Sheets-Sheet 1

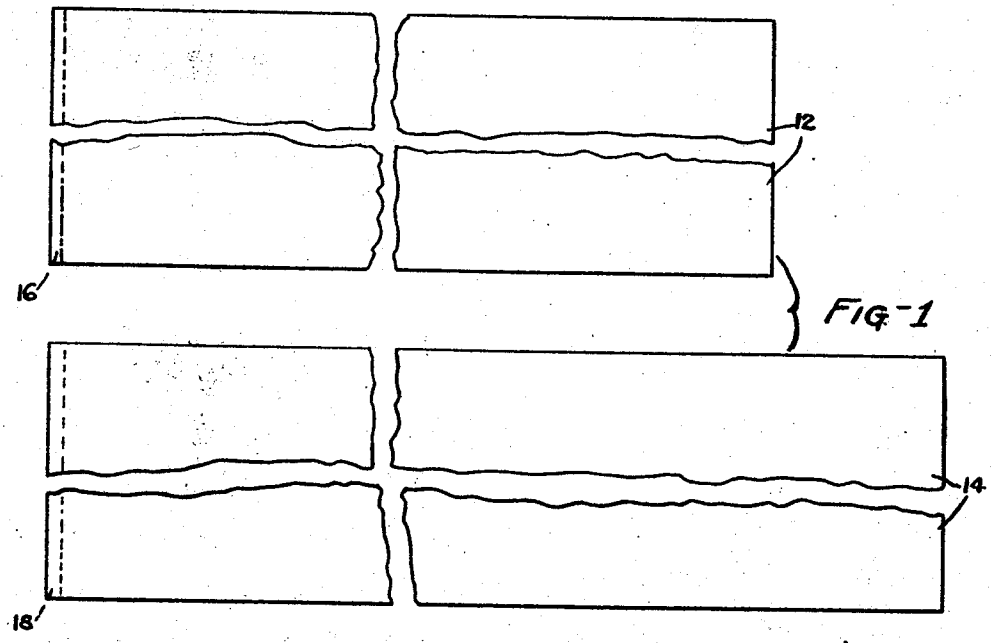


FIG. 1

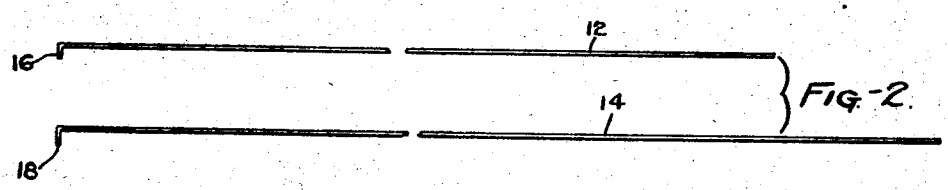


FIG. 2.

FIG. 3

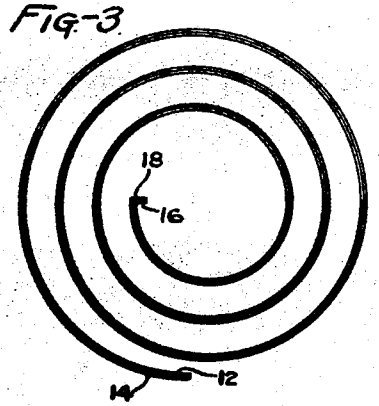
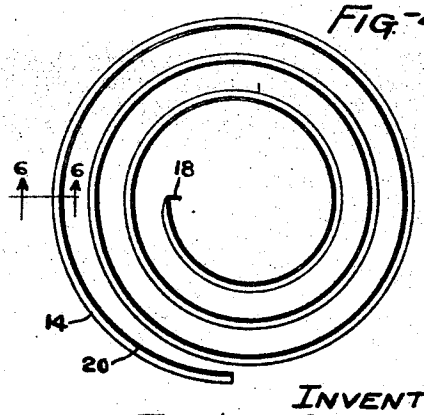


FIG. 4



INVENTOR:
JOHN O. OLSON.
BY Whiteley and Ruckman
ATTORNEYS.

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FIG. 5.

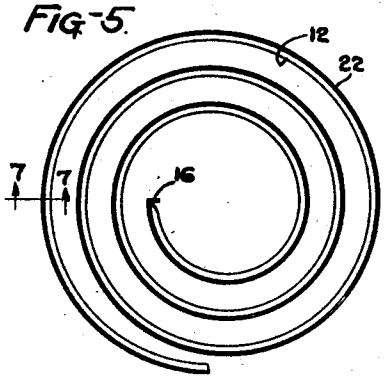
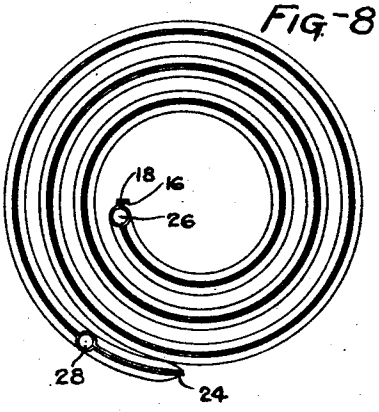


FIG. 8



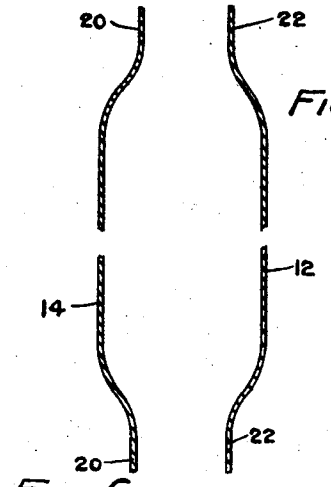
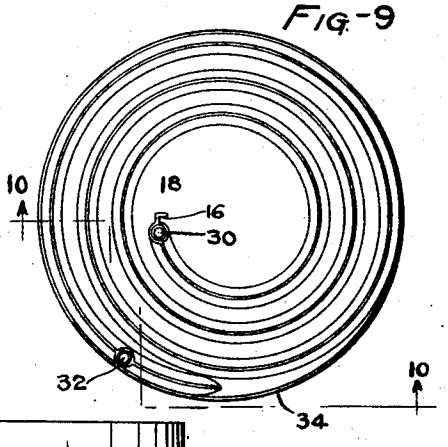


FIG. 7

FIG. 6

FIG. 9



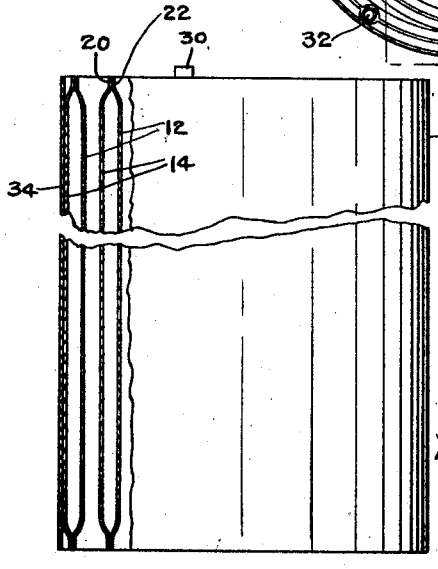


FIG. 10

INVENTOR:
JOHN O. OLSON.
BY Whiteley and Ruckman
ATTORNEYS.

Patented Nov. 10, 1925. 1,560,719

UNITED STATES PATENT OFFICE.

JOHN OTTO OLSON, OF ST. PAUL, MINNESOTA, ASSIGNOR TO SPIRAL RADIATOR COMPANY, OF ST. PAUL, MINNESOTA, A CORPORATION.

METHOD OF FORMING A CLOSED SPIRAL CHAMBER FROM SHEET METAL.

Application filed May 7, 1924. Serial No. 711,600.

To all whom it may concern:

Be it known that I, JOHN OTTO OLSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in a Method of Forming a Closed Spiral Chamber from Sheet Metal, of which the following is a specification.

My invention relates to a method of forming a closed spiral chamber from sheet metal, and an object is to produce such a chamber of comparatively shallow and wide cross-section in such manner that the two metal sheets constituting the walls of the chamber will be symmetrically curved without kinks or other imperfections, and will be held properly spaced in parallel relation and with their edges united to form a tight joint without the use of filler strips or other means of spacing than the material which is shaped to form the joint. A special object of the invention is to produce a spiral chamber of this character economically and with the above characteristics for use wherever it is desired to effect a rapid exchange of heat such as in radiators for heating plants, motor vehicles, etc.

The full objects and advantages of my invention will appear in connection with the detailed description, and the novel features of my inventive idea will be particularly pointed out in the claims.

In the drawings which illustrate the successive changes in the material as the spiral chamber is formed by my method, Fig. 1 is a plan view of two sheets of metal, one of which is longer than the other. Fig. 2 is an edge view of the two sheets after the first bending operation has been performed. Fig. 3 shows the two sheets after they have been placed together and coiled up into spiral form. Fig. 4 shows the outer coiled member with its opposite edges shaped inwardly after the coiled members have been separated from each other. Fig. 5 shows the inner coiled member with its opposite edges shaped outwardly after the coiled members have been separated from each other. Fig. 6 is a view in section on the line 6—6 of Fig. 4. Fig. 7 is a view in section on the line 7—7 of Fig. 5. Fig. 8 is a view showing the shaped coiled members placed together and having their margins sealed to form a spiral chamber. Fig. 9 is a plan view showing the completed spiral chamber placed in a cylindrical shell. Fig. 10 is a view partly in side elevation and partly in vertcal section showing the completed spiral chamber in the cylindrical shell.

The first step in the process of forming the spiral chamber is to cut two sheets of metal 12 and 14 which are of the same width and are of the proper length to form the inside and outside walls respectively of said chamber. The exact relative lengths of the two sheets may be determined both experimentally and mathematically and obviously are varied in accordance with the size of the chamber and the distance apart at which the walls are spaced. In general, it may be stated that the best results are obtained by forming the chamber with the walls thereof spaced quite close together, a maximum distance of from one-half of an inch to one inch being found to give the best results. After the sheets have been cut to the proper relative lengths, each sheet at one end is bent at right angles to form the flanges 16 and 18 and the two sheets are then placed together with the flanges 16 and 18 in engagement with each other. The flanges are fastened in a machine and the sheets are coiled up as shown in Fig. 3, the longer sheet being on the outside. The coiled up sheets are separated or pulled apart and are separately shaped, the outer coil being turned inwardly at its opposite edges as indicated at 20 in Figs. 4 and 6, the inside coil being turned outwardly at its opposite edges as indicated at 22 in Figs. 5 and 7 in order to produce a suitable space between the coiled up members when they are again placed together or telescoped so as to produce a flattened tube of spiral form. The inner ends are fastened together and the two coiled members are pulled together from the outer ends and fastened. The coiled members are then sealed along the edges to make a tight joint preferably by welding, the outer ends being brought together as indicated at 24 in Fig. 8 and one edge being expanded into tubular form near the inner and outer ends as indicated at 26 and 28. The pipe connections 30 and 32 are secured in the expanded portions 26 and 28 respectively. A band or cylindrical sheet metal shell 34 may be placed around the completed spiral chamber. Figs. 9 and 10 are intended to represent particularly an adaptation of a spiral

chamber formed in accordance with my method for use as a radiator in heating plants where circulation of a heat conveying medium is employed for heating the rooms of a building. It is obvious that the supply and return pipes for the steam will be connected to the pipe connections 30 and 32.

I claim:

1. The method of forming closed spiral chambers from sheet metal, which consists in cutting two sheets of the proper size to form the outer and inner walls of the chamber, placing said sheets in proper relative position one on the other, forming the same concurrently into spiral members, taking apart said spiral members, shaping the opposite edges of the outer member inwardly, shaping the opposite edges of the inner member outwardly, placing the shaped spiral members together, and securing the edges of the two members to make a tight joint.

2. The method of forming closed spiral chambers from sheet metal, which consists in cutting two sheets of different lengths to form the outer and inner walls of the chamber, placing said sheets in proper relative position one on the other, forming the same concurrently into spiral members, taking apart said spiral members, shaping the opposite edges of the outer member inwardly, shaping the opposite edges of the inner member outwardly, placing the shaped spiral members together, and securing the edges of the two members to make a tight joint.

3. The method of forming closed spiral chambers from sheet metal, which consists in cutting two sheets of the proper size to form the outer and inner walls of the chamber, bending said sheets at one end to form flanges, placing said sheets in proper relative position one on the other with said flanges in engagement with each other, forming the same concurrently into spiral members, taking apart said spiral members, shaping the opposite edges of the outer member inwardly, shaping the opposite edges of the inner member outwardly, placing the shaped spiral members together, and securing the edges of the two members to make a tight joint.

4. The method of forming closed spiral chambers from sheet metal, which consists in cutting two sheets of different lengths to form the outer and inner walls of the chamber, bending said sheets at one end to form flanges, placing said sheets in proper relative position one on the other with said flanges in engagement with each other, forming the same concurrently into spiral members, taking apart said spiral members, shaping the opposite edges of the outer member inwardly, shaping the opposite edges of the inner member outwardly, placing the shaped spiral members together, and securing the edges of the two members to make a tight joint.

5. The method of forming closed spiral chambers from sheet metal, which consists in cutting two sheets of different lengths to form the outer and inner walls of the chamber, bending said sheets at one end to form flanges, placing said sheets in proper relative position one on the other with said flanges in engagement with each other, securing said flanges together, forming the sheets concurrently into spiral members, taking apart said spiral members, shaping the opposite edges of the outer member inwardly, shaping the opposite edges of the inner member outwardly, placing the shaped spiral members together, fastening the flanged inner ends of said spiral members together, pulling said spiral members together from their outer ends and fastening the same, and then securing the edges of the two members to make a tight joint.

In testimony whereof I hereunto affix my signature.

JOHN OTTO OLSON.